

Eye Structure

Level: S2

Topic: Unit 11 Sensing the Environment – Eye Structure (Section 11.2 of Unit 11)

Introduction:

This set of ELA materials is developed for academically more able students. The two ELAs are designed to develop the new concept ‘accommodation of the eye’, through the medium of English. They aim to help students learn the vocabulary and develop the English writing skills to (i) label the main parts of the eye and (ii) describe the process of accommodation with respect to change of brightness and distance of an object.

The two ELAs are

ELA1 Eye structure – the main parts of the eye

ELA2 Eye structure – the accommodation of the eye

Each ELA is designed for a single period. ELA1 and ELA2 may or may not be conducted in a double lesson. When they are conducted separately in two single lessons, the vocabulary terms – such as pupil, lens, retina, etc. – should be revised at the start of the second lesson. The ELA materials of this teaching package consist of lesson plans, PowerPoint slides, worksheets and a set of Bingo cards.

Acknowledgement

This set of materials was produced jointly by the teachers of Tang Shiu Kin Victoria Government Secondary School and the ELA research team.

ELA1 Lesson Plan – Eye structure – Main parts of the eye

Description: This ELA covers Section 11.2, Unit 11 of the CDC Science syllabus. The students will learn the English names of the main parts of the eye using illustrations similar to those found in their Chinese textbooks. To raise students' interest and consolidate their learning, a Bingo game is used.

Content After completing the activity, students should be able to:

Objectives:

- identify the main parts of the eye - cornea, iris, pupil, lens, optic nerve, retina

Language After completing the activity, students should be able to:

Objectives:

- understand and use the English terms related to this topic (e.g., *eye structure, pupil, eyelid, eyelashes, iris, white protective coat, sclera, optic nerve, cornea, side view, lens, retina, blind spot, optic nerve*);
- name in English the main parts of the eye - *cornea, iris, pupil, lens, optic nerve and retina*.
- Understand the instructions for playing the Bingo game.

Activities:

1. Vocabulary Building – whole-class activity with individual work (15 min)
2. Bingo Game – whole-class activity (20 min)
3. Summary – whole-class activity (5 min)

Materials:

- 1 worksheet (WS1: *Eye Structure*)
- 1 set of Bingo cards
- 1 set of PowerPoint slides (Set 1: *S2 Eye structure_ Bingo Game*)

Steps

Vocabulary Building (15 min)

1. The teacher should start by stating the learning objective of the lesson and telling students that it includes a Bingo game.
2. The teacher asks students to complete Part A of Worksheet 1 (WS1). In doing so, students use the textbook to look up the names of parts of the eye in English.
3. The teacher then checks the answers with the aid of Slide 1 of PowerPoint Set1 and practises the pronunciation of the terms with the students.

4. In Part B, students are asked to close the textbook and complete the fill-in-the-blanks exercise using English.
5. The teacher again checks the answers with the aid of Slide 2 of PowerPoint Set1 and practises the pronunciation of the terms with the students

Refer to Teacher's note (TN1)

6. In Part C, students are asked to use English to name the parts of the eye that they have come across in Parts A and B. The teacher should remind students that these parts belong to the external structure of the eye.

Refer to Teacher's note (TN2)

7. In checking the answers with the aid of Slide 3 of PowerPoint Set1, the teacher should practise the pronunciation of the terms with the students.

Bingo Game (20 min)

Refer to Teacher's note (TN3)

8. Each student is given a Bingo card.
9. The teacher should explain the game to students using the example on Slide 4 of PowerPoint Set 1.
10. The the teacher starts playing the game. After the chosen PowerPoint slide is displayed, students should be allowed to have about 5 seconds to work out whether the corresponding diagram or label is on their Bingo card. The teacher should also allow students to ask questions, if they have any queries.
11. When displaying the third slide, the teacher could remind students to check whether they have scored a point.

Refer to Teacher's note (TN4)

12. The game should be stopped once a student successfully gets all cells crossed.

Refer to Teacher's note (TN5)

Summary (5 min)

13. Summarize the lesson using Q&A. For example, point at one part of the eye and ask students to name it and spell the name (check their spelling and pronunciation). Alternatively, read the name of one part of the eye and ask students to identify it in a diagram.

Teacher's notes

TN 1: Before checking the answers, challenge students to see if they can identify and label the parts that are given in Part A but not in Part B. This alerts students to the parts of the eye which are external features.

TN 2: The interactive diagram found at http://www.exploratorium.edu/learning_studio/cow_eye/eye_diagram.html or <http://www.purchon.com/biology/eye.htm> can be used for showing the answers.

TN 3: Students may play the Bingo game in groups or individually. To play individually, each student is given a Bingo card. Each card has a 3x3 grid, each cell of which contains either a diagram of the eye with one part of it highlighted or the name of a part of the eye. Teachers will display on the board a name of one part of an eye or a diagram of an eye with one part highlighted each time. Then, students try to match it with those on their cards. (Remark: A correct match means a name matches with a diagram, but not two identical names or diagrams. For example, “Lens” and the

diagram  is a correct match.) Once a match is found, students cross out the matched cell. In this game, the students who can cross out a row, a column or a diagonal of cells gains one point. The ones who get all the cells crossed out first or the ones with the highest score are the winners. Teachers may give prizes for the winners as encouragement.

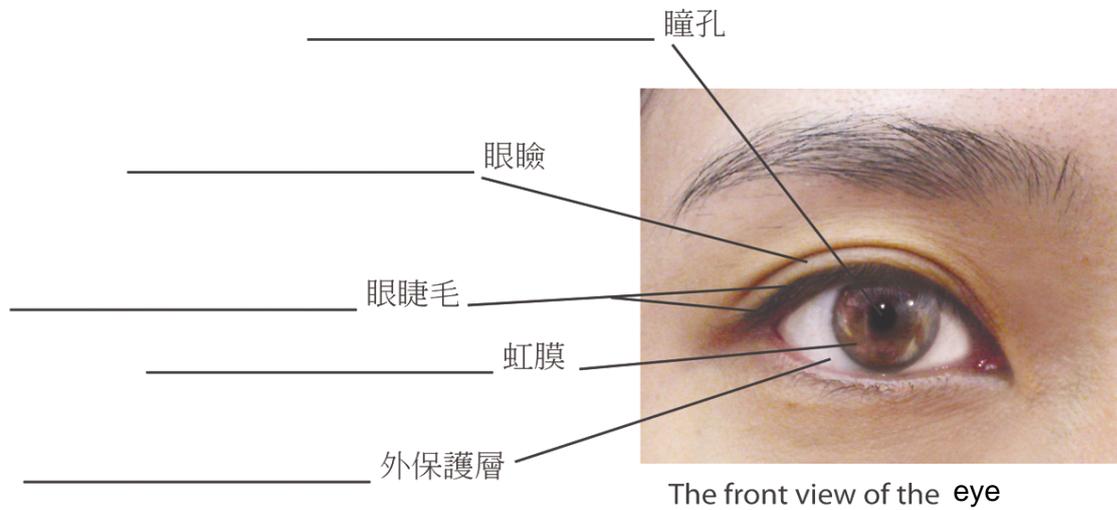
TN4: Teachers may ask neighbouring students to cross-check each others' results.

TN 5: Teachers are suggested to set up the Bingo game carefully so that the outcomes of the game are very much under his or her control. (Remark: Slide 5 of PowerPoint Set 1 provides an example in which the student(s) holding Card 1 will be the winner(s).)

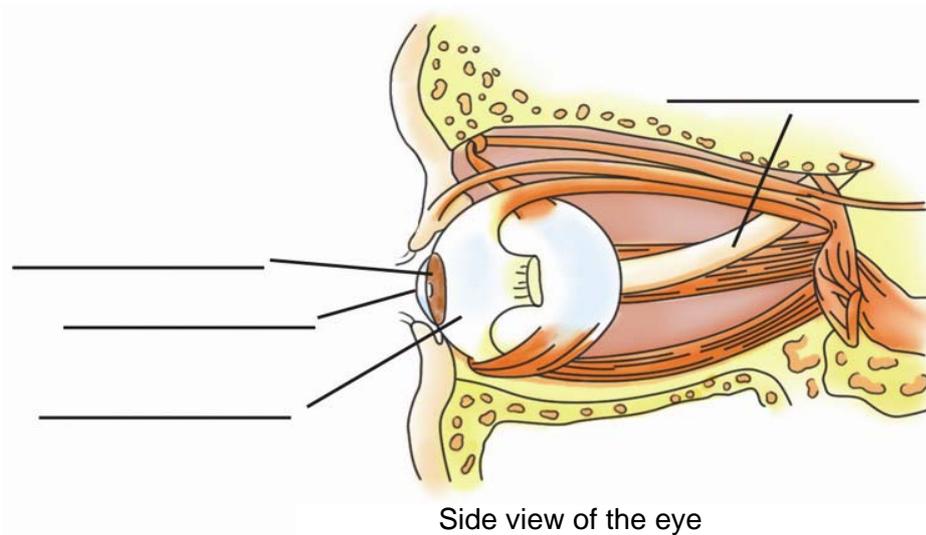
WS1: Eye Structure

Class:___ Name : _____ ()

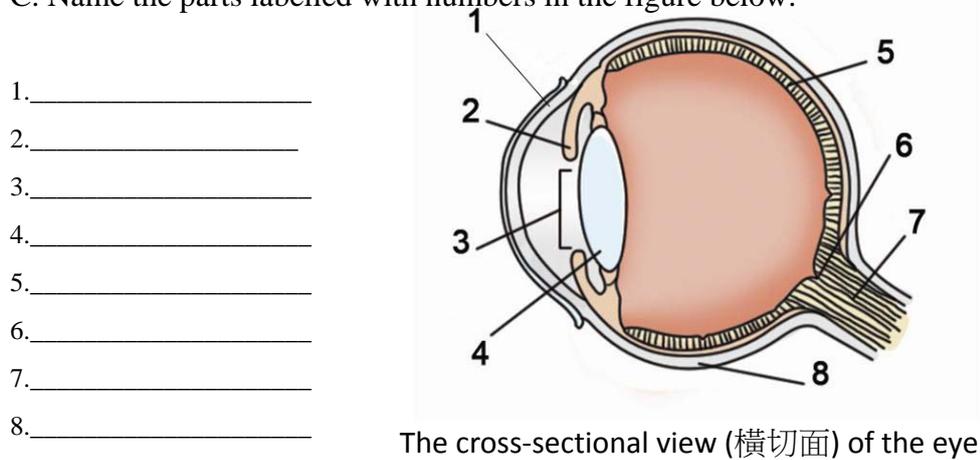
A. Write the English names of the following parts.



B. Fill in the blanks



C. Name the parts labelled with numbers in the figure below.



WS1: Eye Structure

Class:___ Name : _____ ()

A. Write the English names of the following parts.

Teacher version

pupil 瞳孔
 eyelid 眼瞼
 eyelashes 眼睫毛
 iris 虹膜
 white protective coat (sclera) 外保護層

The front view of the eye

B. Fill in the blanks

eyelid
 eyelashes
 iris
 cornea
 white protective coat (sclera)
 optic nerve

Side view of the eye

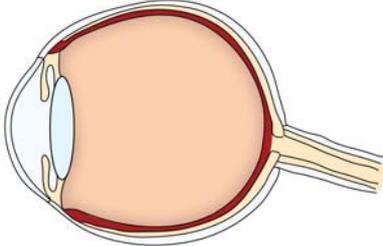
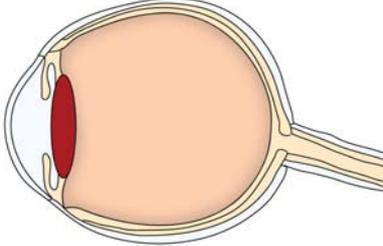
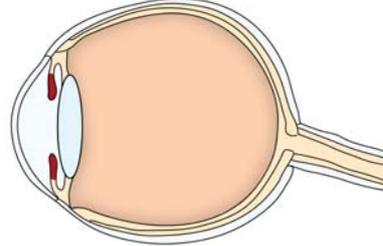
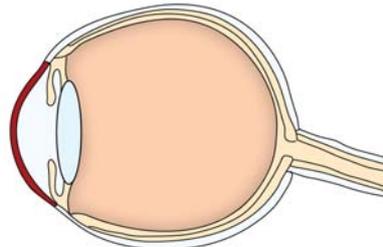
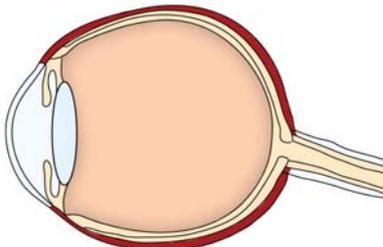
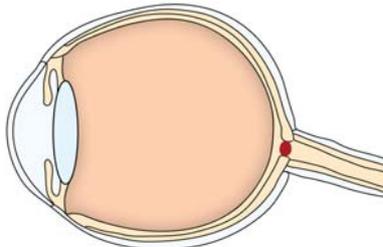
C. Name the parts labelled with numbers in the figure below.

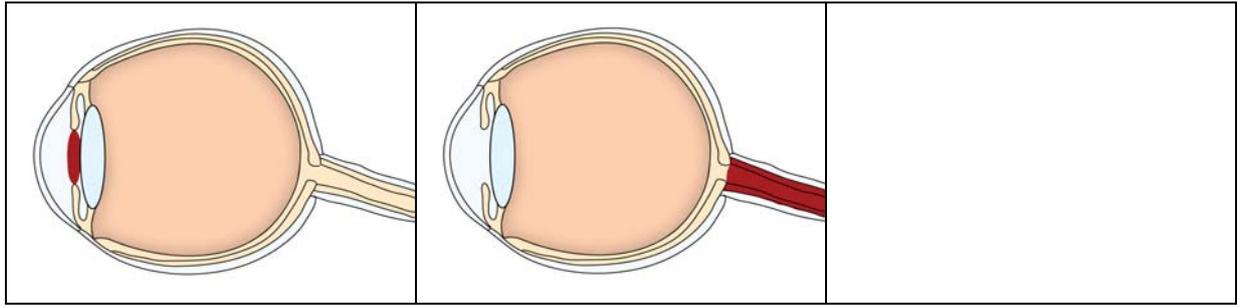
1. cornea
2. iris
3. pupil
4. lens
5. retina
6. blind spot
7. optic nerve
8. white protective coat (sclera)

The cross-sectional view (橫切面) of the eye

Bingo cards

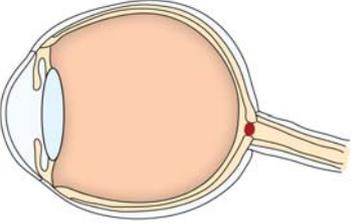
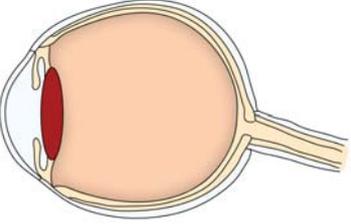
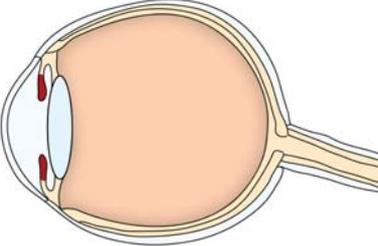
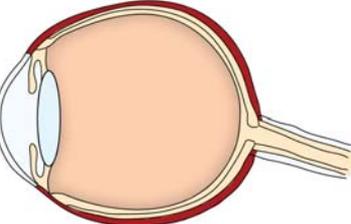
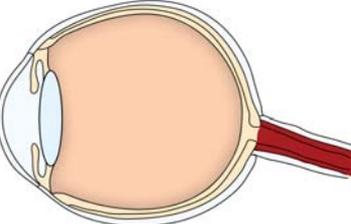
Master Card

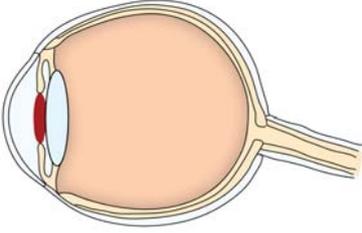
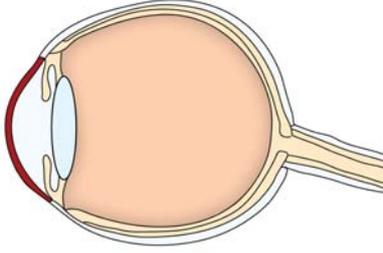
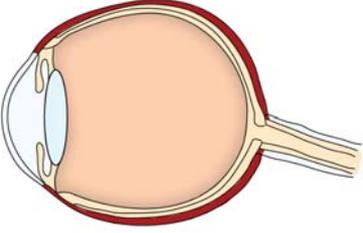
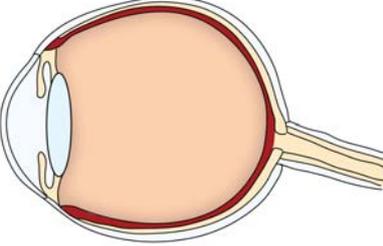
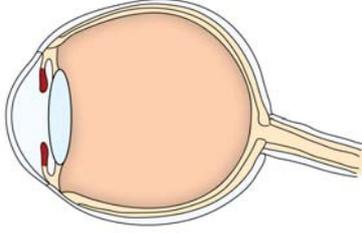
<p><u>retina</u></p>	<p><u>lens</u></p>	<p><u>iris</u></p>
		
<p><u>cornea</u></p>	<p><u>sclera</u></p>	<p><u>blind</u> <u>spot</u></p>
		
<p><u>pupil</u></p>	<p><u>optic</u> <u>nerve</u></p>	

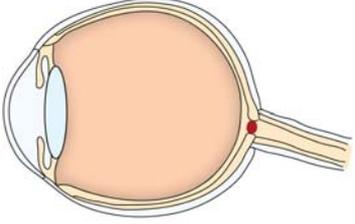
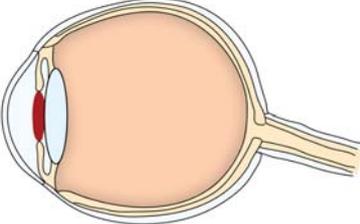
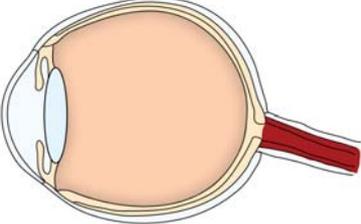
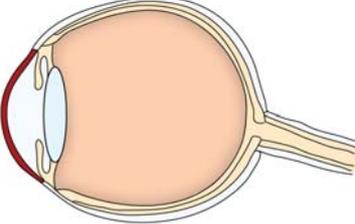


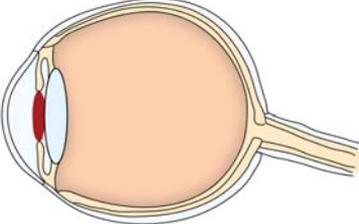
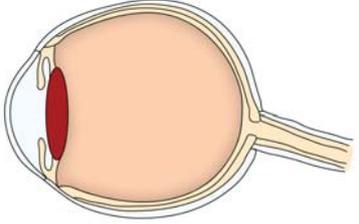
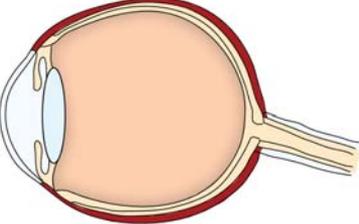
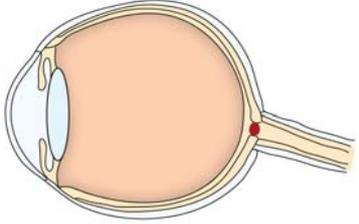
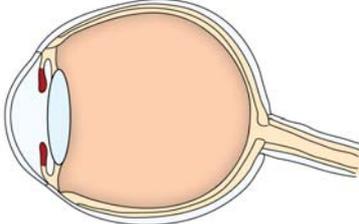
Card 1

	<p>lens</p>	
		<p>sclera</p>
<p>retina</p>	<p>optic nerve</p>	

<p>cornea</p>		
	<p>retina</p>	<p>iris</p>
<p>blind spot</p>		

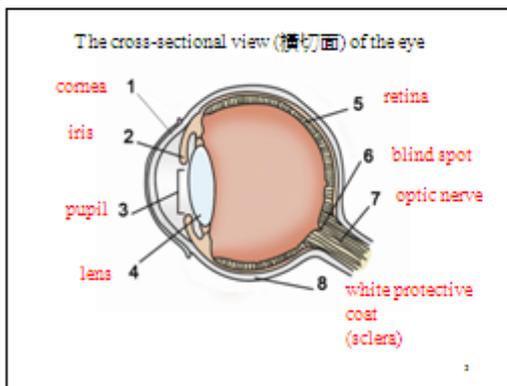
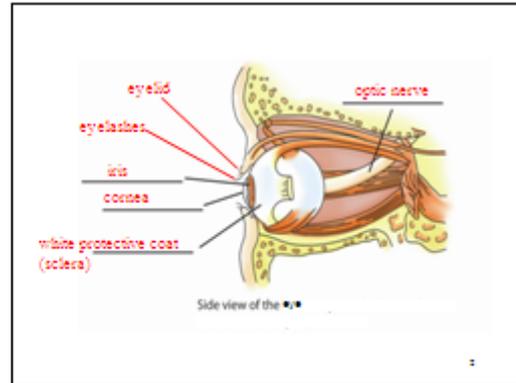
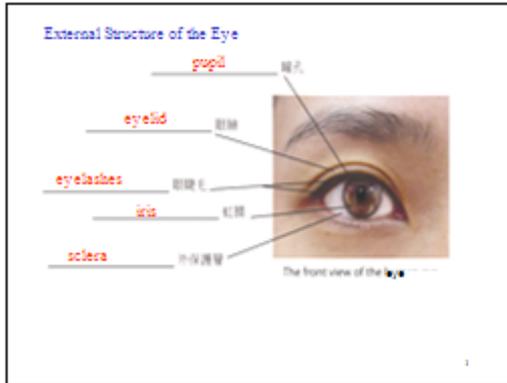
<p>optic nerve</p>	<p>sclera</p>	
		<p>cornea</p>
	<p>lens</p>	

<p>retina</p>	<p>optic nerve</p>	
		<p>sclera</p>
<p>lens</p>	<p>pupil</p>	

<p>retina</p>		
		<p>sclera</p>
<p>blind spot</p>	<p>optic nerve</p>	

PowerPoint slides Set 1 – Eye structure Bingo Game

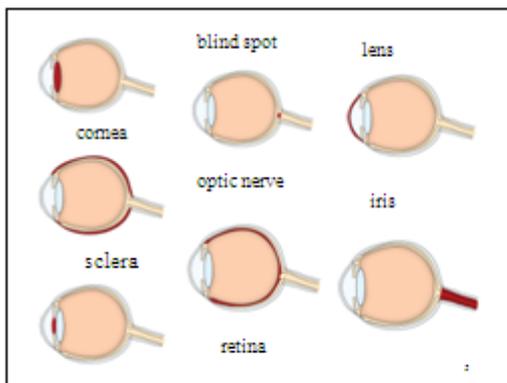
Powerpoint Slides Set 1 S2 Eye Structure_Bingo Game



Bingo Game Example

lens 1 point

retina	lens	iris
		
cornea	sclera	blind spot



Bingo Result

- Card 1 Bingo!

ELA2 Lesson Plan – Eye structure – Accommodation of the eye

Description: This ELA covers Section 11.2, Unit 11 of the CDC Science syllabus. The students have learned the English names of the main parts of the eye. The teacher helps students develop understanding of the process of accommodation, using English. A worksheet is provided to enhance students' writing skills. The worksheet includes a series of writing tasks, with the earlier ones involving filling in the blanks (with words or short phrases) and the latter ones requiring students to write their answers in complete sentences.

Content After completing the activity, students should be able to:

Objectives:

- relate the main parts of the eye to our sense of vision.

Language After completing the activity, students should be able to:

Objectives:

- understand and use the English terms related to accommodation of the eye (e.g., *adjust, bright light, dim light, bright object*,
- describe the accommodation of the eye to different degrees of brightness and to different distances of objects from the eye, e.g.,
 - *Our eyes adjust to look at different objects, far or near, bright or dim.*
 - *The iris controls the size of the pupil in looking at bright or dim objects.*
 - *When we look at a bright object, our pupils become smaller. Less light will enter our eyes.*
 - *When we look at a dim object, our pupils become larger. More light will enter our eyes.*
 - *The thickness of the lens changes for looking at far or near objects.*
 - *When we look at a distant object, our lenses become thinner. The light from the object will be focused onto the retina.*
 - *When we look at a near object, our lenses become thicker. The light from the object will be focused onto the retina.*
 - *When Peter looks at a star in the sky, his pupils become larger and his lenses become thinner.*
 - *When Peter looks at a lamp, his pupils become smaller and his lenses become thicker.*
 - *When we look at near objects, our lenses become thicker. So, the thicker lenses focus the light from the objects onto the retina.*
 - *When we look at objects in dim light, our pupils become larger. So, more light will enter our eyes.*

- Activities:
1. Writing practice on the accommodation of the eye – whole – class activity with individual work (30 min)
 2. Short quiz –individual work (10 min)

- Materials:
- 1 worksheet (WS2: *How can our eyes adjust in different conditions*)
 - 1 short quiz

Steps:

Writing practice on the accommodation of the eye – class activity with individual work (30 min)

Refer to Teacher's note (TN1)

1. The teacher should distribute worksheet WS2.
2. The teacher discusses with students the accommodation of the eye to different degrees of brightness.

Refer to Teacher's note (TN2)

3. Students should be asked to complete the first two sentences of WS2. They should be encouraged to follow the sentence pattern of the first sentence in putting down the answer for the second question.
4. The teacher then checks the answers, asking some students to write their answers on the blackboard and to read them out. The teacher then checks and corrects students' pronunciation.
5. The teacher discusses with students the accommodation of the eye to objects at different distances.

Refer to Teacher's note (TN3)

6. Students should then be asked to complete the next two sentences of WS2 and encouraged to follow the sentence pattern of the third sentence in putting down the answer for the fourth question.
7. The teacher then checks the answers, asking some students to write their answers on the blackboard and to read them out. The teacher should check and correct students' pronunciation.

Refer to Teacher's note (TN4)

8. The teacher should explain to the whole class the question that follows. Ask students what the differences between a star and a lamp are in terms of brightness and distance. Give hints to students to make use of the sentence pattern learned previously in writing their answers.

Short quiz –individual work (10 min)

9. Distribute the Question and Answer Sheet of the quiz.
10. After 5 min, check answers and collect students' work.

Teacher's notes

TN1: Teachers may use an on-line interactive quiz

(http://www.kscience.co.uk/animations/eye_drag.htm) to review with students the names of the main parts of the eye.

TN2: Teachers may explain the accommodation of the eye to different degrees of brightness with the aid of on-line interactive animations (e.g.

<http://www.kscience.co.uk/animations/eye.htm>).

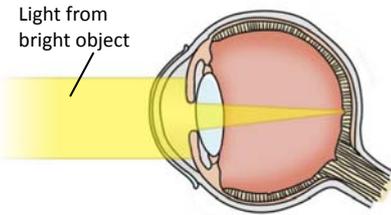
TN3: Teachers may explain the accommodation of the eye to objects at different distances with the aid of on-line interactive animations (e.g. <http://www.kscience.co.uk/animations/eye.htm>).

TN4: The teacher will go through the questions with the class one by one. However, the more able students may work out the first four questions by themselves without needing the help of the teacher. These students should be encouraged to work on the remainder of the worksheet.

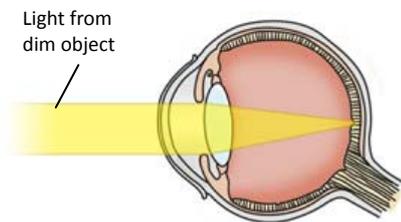
WS2: How can our eyes adjust to different conditions?

Complete the sentences

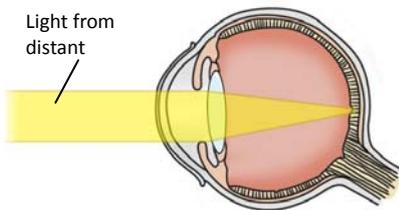
Our eyes adjust to look at different objects, far or near, bright or dim. The _____ controls the size of the _____ in looking at bright or dim objects.



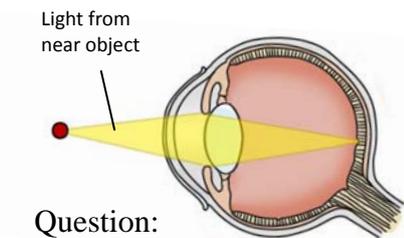
When we look at a _____ object, our _____ become smaller. Less light will enter our eyes.



The thickness of the _____ changes for looking at far or near objects.



When we look at a _____ object, our _____ become thinner. The light from the object will be focused onto the _____.



Question:

1. Describe how Peter's eyes adjust to look at the object in Fig. a and Fig. b.

✦ star

lamp



Fig. a Peter looks at a star at night

Fig. b Peter looks at a lamp which is turned on

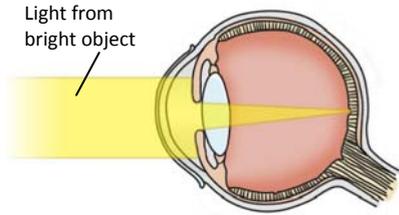
In Fig. a,

In Fig. b,

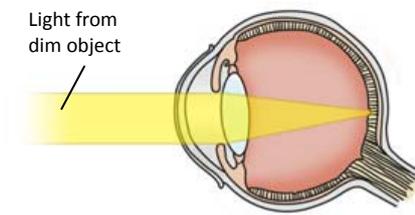
WS2: How can our eyes adjust in different conditions?

Complete the sentences

Our eyes adjust to look at different objects, far or near, bright or dim. The Iris controls the size of the pupil in looking at bright or dim objects.

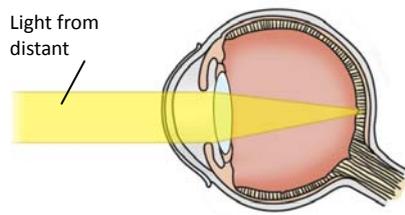


When we look at a bright object, our pupils become smaller. Less light will enter our eyes.

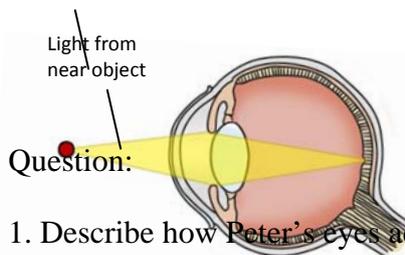


When we look at a dim object, our pupils become larger. More light will enter our eyes.

The thickness of the lens changes for looking at far or near objects.



When we look at a distant object, our lenses become thinner. The light from the object will be focused onto the retina.



When we look at a near object, our lenses become thicker. The light from the object will be focused onto the retina.

1. Describe how Peter's eyes adjust to look at the object in Fig. a and Fig. b.



Fig. a Peter looks at a star at night

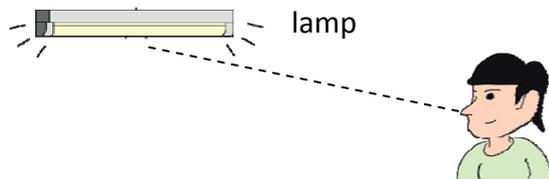


Fig. b Peter looks at a lamp which is turned on

In Fig. a when Peter looks at a star, his pupils become larger and his lenses become thinner.

In Fig. b when Peter looks at a lamp, his pupils become smaller and his lenses become thicker.

Class: _____ Name: _____ ()

Quiz - How can our eyes adjust to different conditions?

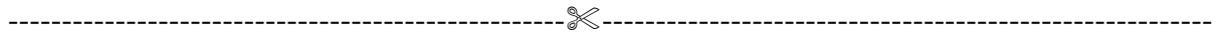
Answer the following questions in full sentences.

1. When we look at near objects, what changes occur in our eyes ?

(2 marks)

2. What changes occur in our eyes when we are looking at objects in dim light?

(2 marks)



Class: _____ Name: _____ ()

Quiz - How can our eyes adjust to different conditions?

Answer the following questions in full sentences.

1. When we look at near objects, what changes occur in our eyes ?

(2 marks)

2. What changes occur in our eyes when we are looking at objects in dim light?

(2 marks)

Class:____Name:_____ ()

Quiz - How can our eyes adjust to different conditions? (Suggested Answers)

Answer the following questions in full sentences.

1. When we look at near objects, what changes occur in our eyes ?

When we look at near objects, our lenses become thicker.

So, the thicker lenses focus the light from the objects onto the retina.

(2 marks)

2. What changes occur in our eyes when we are looking at objects in dim light?

When we look at objects in dim light, our pupils become larger. So, more light will enter our eyes.

(2 marks)